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(54) A still picture transmission apparatus

(57) A still picture transmission apparatus in which still picture data is transmitted in packet form from the central terminal having a picture data bank selectively to a plurality of local terminals through a common transmission line at which a plurality of logic channels are established, wherein a command designating a channel number is transmitted to a desired local terminal to which channel the local terminal is to be connected, and a still picture data is transmitted with the use of a packet having said channel number.

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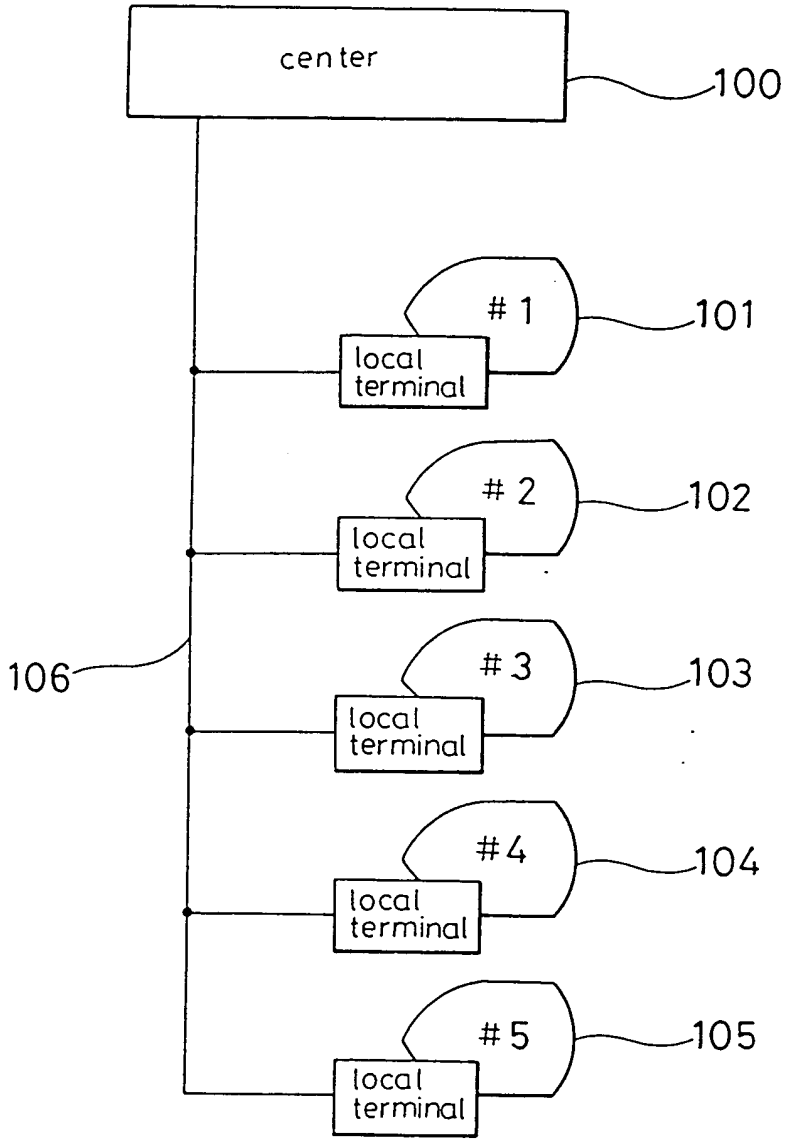
FIG.1.


center
100
#1
101
local terminal
#2
102
local terminal
106
#3
103
local terminal
#4
104
local terminal
#5
105
local terminal

2171578

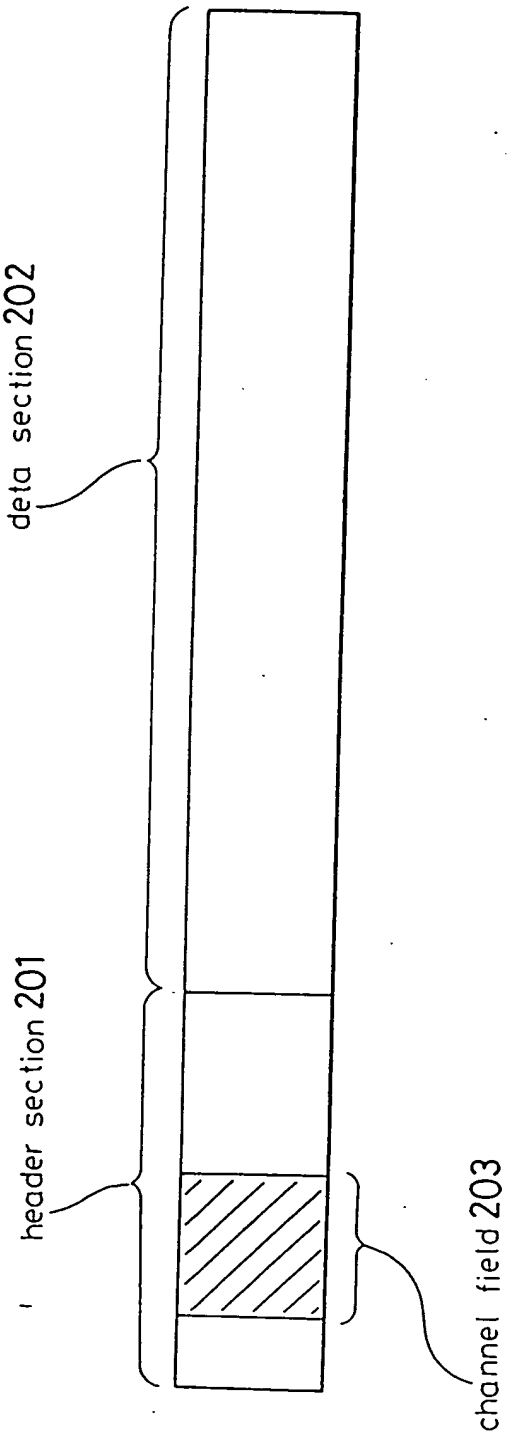


FIG. 2.

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FIG. 3.

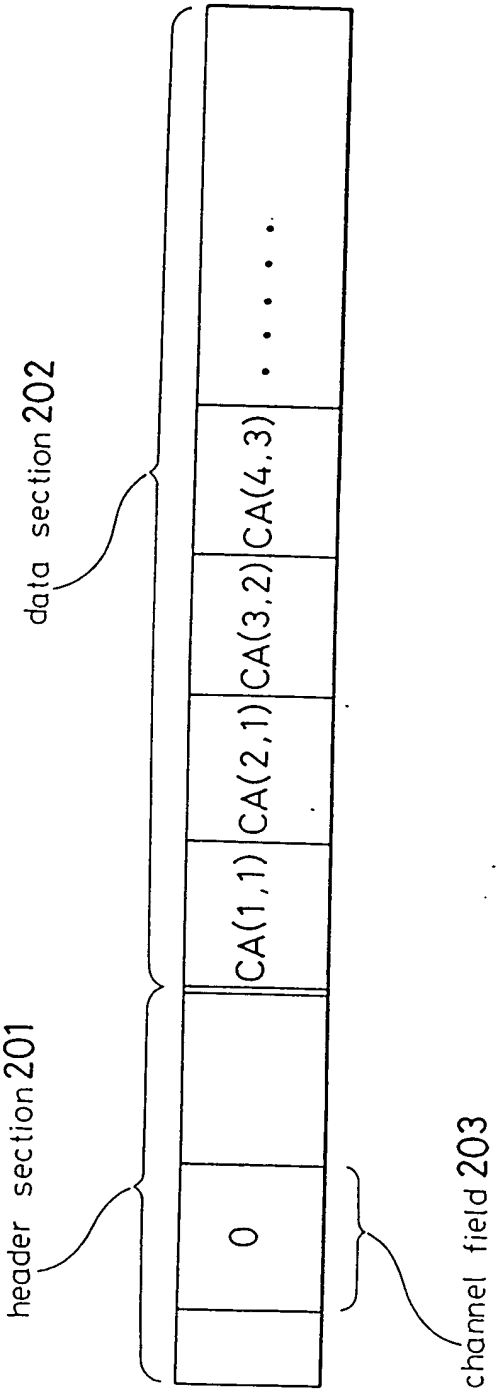

FIG 4.

	transmitting channel				receiving local terminal									
	0	1	2	3	# 1		# 2		# 3		# 4		# 5	
					connected channel	received data	connected channel	received data	connected channel	received data	connected channel	received data	connected channel	received data
301	—	—	—	—	0	—	0	—	0	—	0	—	0	—
302	CA(1,1)	—	—	—	0,1	CA(1,1)	0	CA(1,1)	0	CA(1,1)	0	CA(1,1)	0	CA(1,1)
303	CA(2,1)	—	—	—	0,1	CA(2,1)	0,1	CA(2,1)	0	CA(2,1)	0	CA(2,1)	0	CA(2,1)
304	CA(3,2)	—	—	—	0,1	CA(3,2)	0,1	CA(3,2)	0,2	CA(3,2)	0	CA(3,2)	0	CA(3,2)
305	CA(4,3)	—	—	—	0,1	CA(4,3)	0,1	CA(4,3)	0,2	CA(4,3)	0,3	CA(4,3)	0	CA(4,3)
306	CA(5,1)	—	—	—	0,1	CA(5,1)	0,1	CA(5,1)	0,2	CA(5,1)	0,3	CA(5,1)	0,1	CA(5,1)
307	—	TXA	—	—	0,1	TXA	0,1	TXA	0,2	—	0,3	—	0,1	TXA
308	—	—	TXB	—	0,1	—	0,1	—	0,2	TXB	0,3	—	0,1	—
309	—	—	—	TXC	0,1	—	0,1	—	0,2	—	0,3	TXC	0,1	—
310	TXD	—	—	—	0,1	TXD	0,1	TXD	0,2	TXD	0,3	TXD	0,1	TXD
311	—	CA(3)	—	—	0,3	CA(3)	0,3	CA(3)	0,2	—	0,3	—	0,3	CA(3)
312	—	—	—	TXE	0,3	TXE	0,3	TXE	0,2	—	0,3	TXE	0,3	TXE

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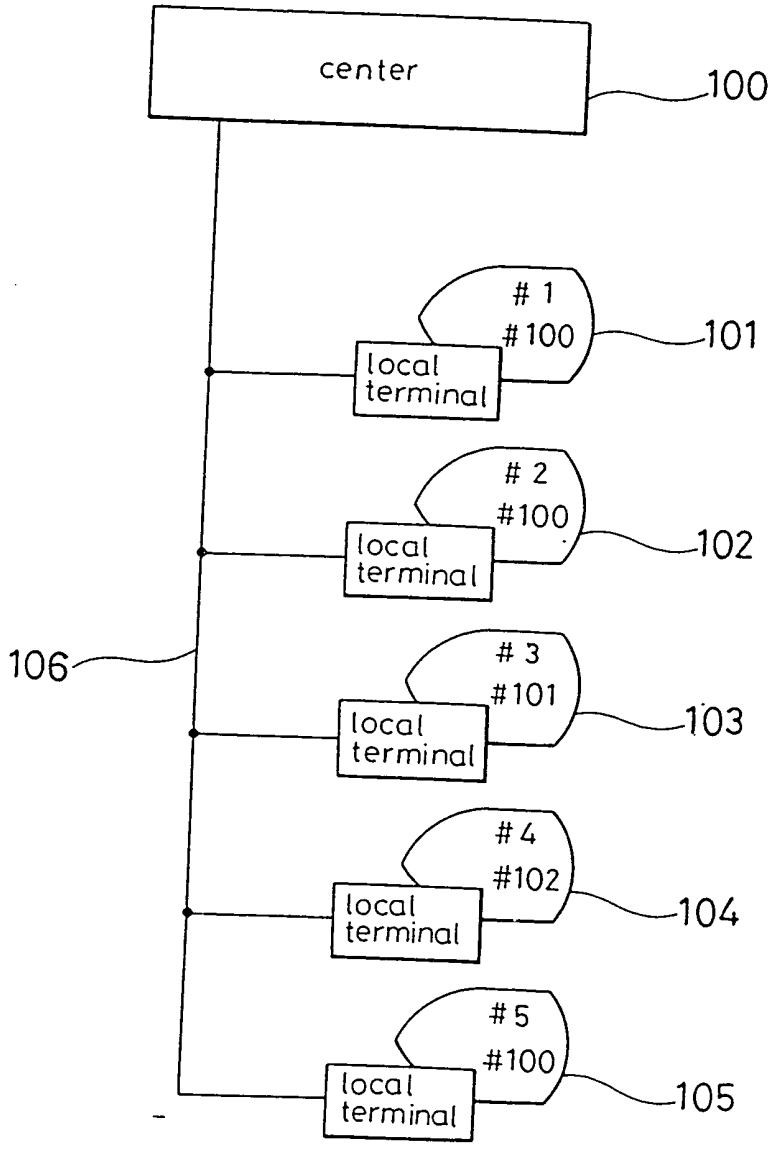
FIG .5.



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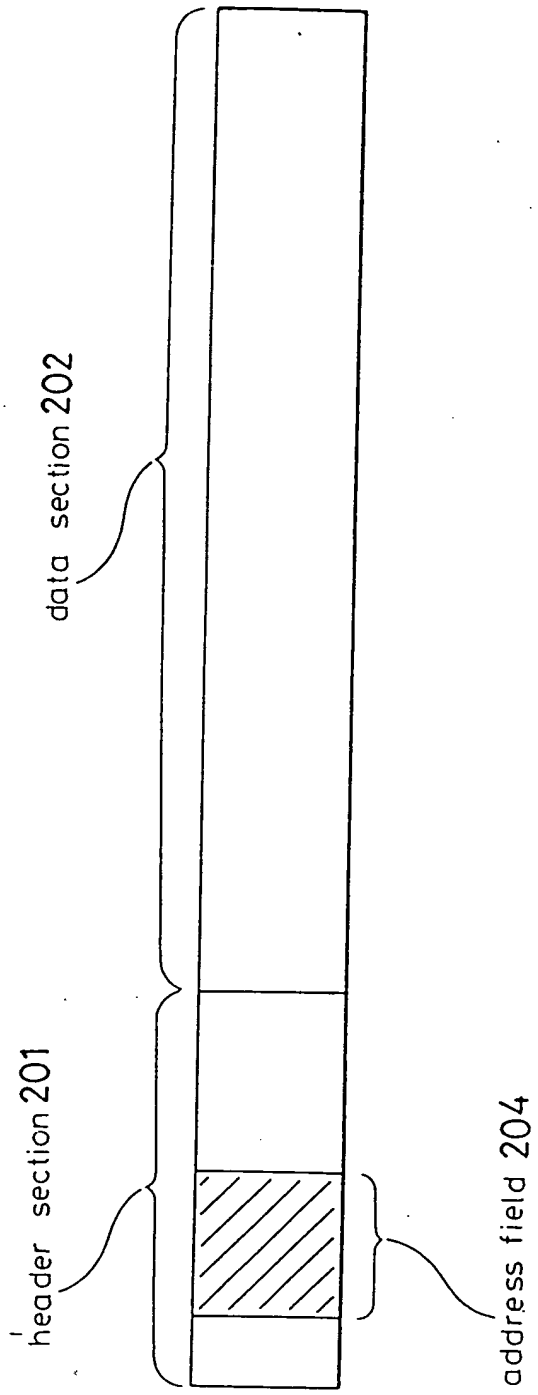

FIG. 6.

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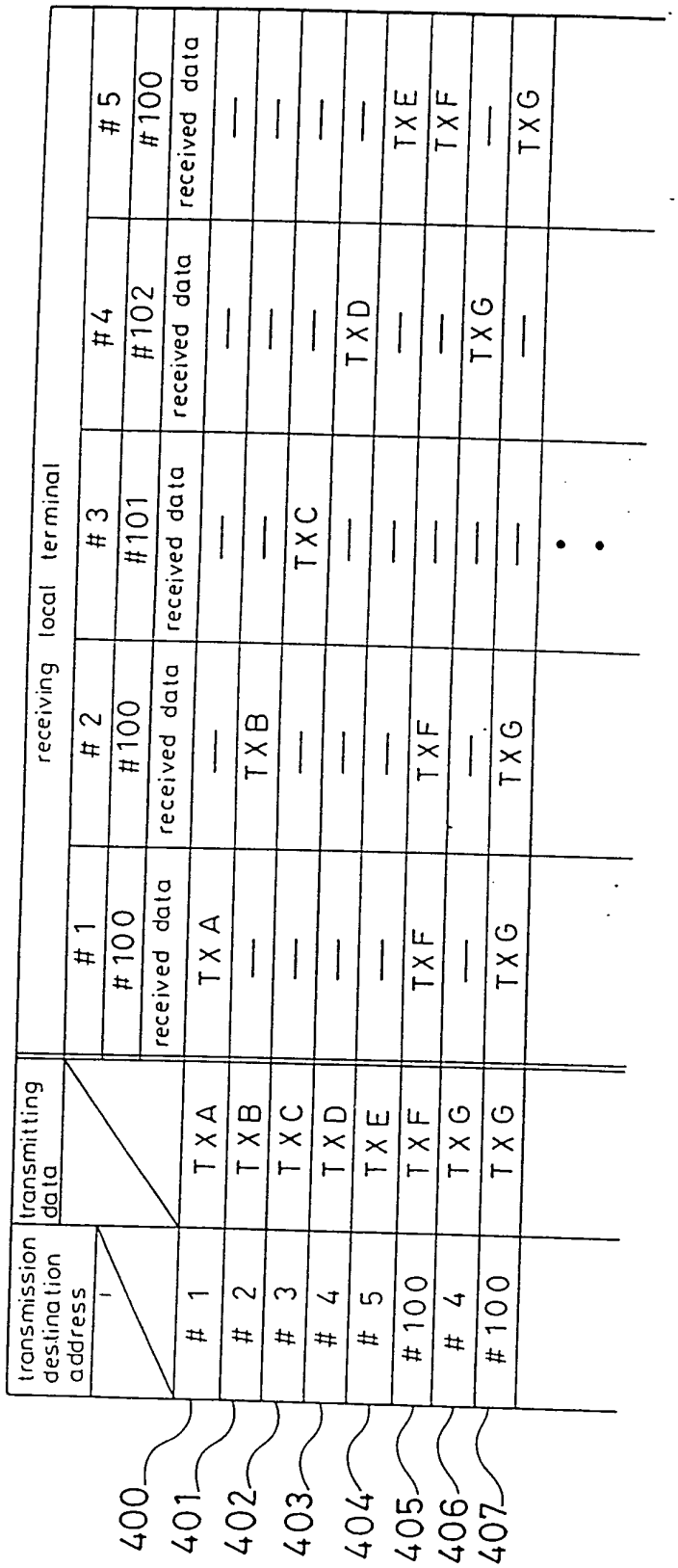
FIG 7.



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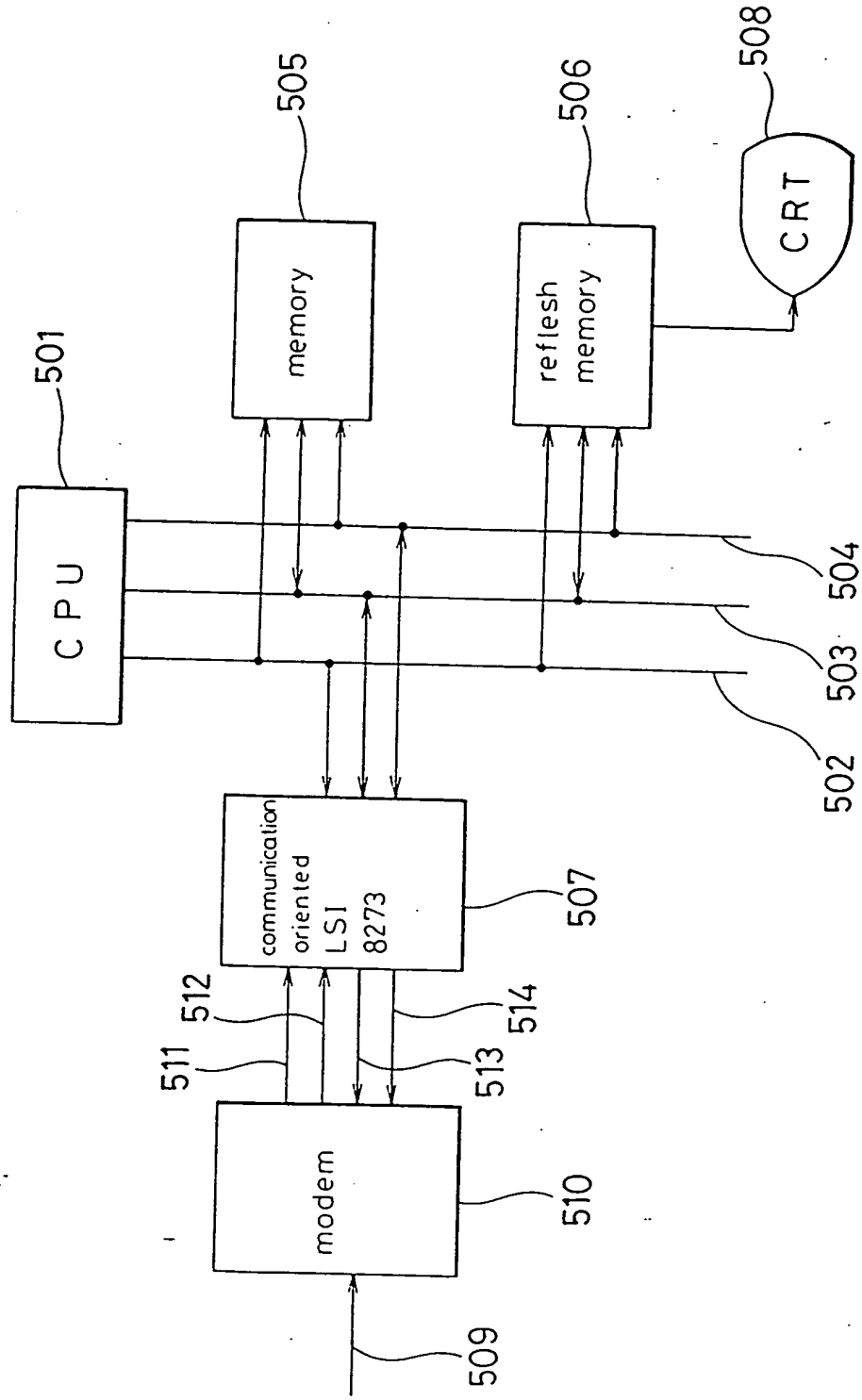

FIG.8.

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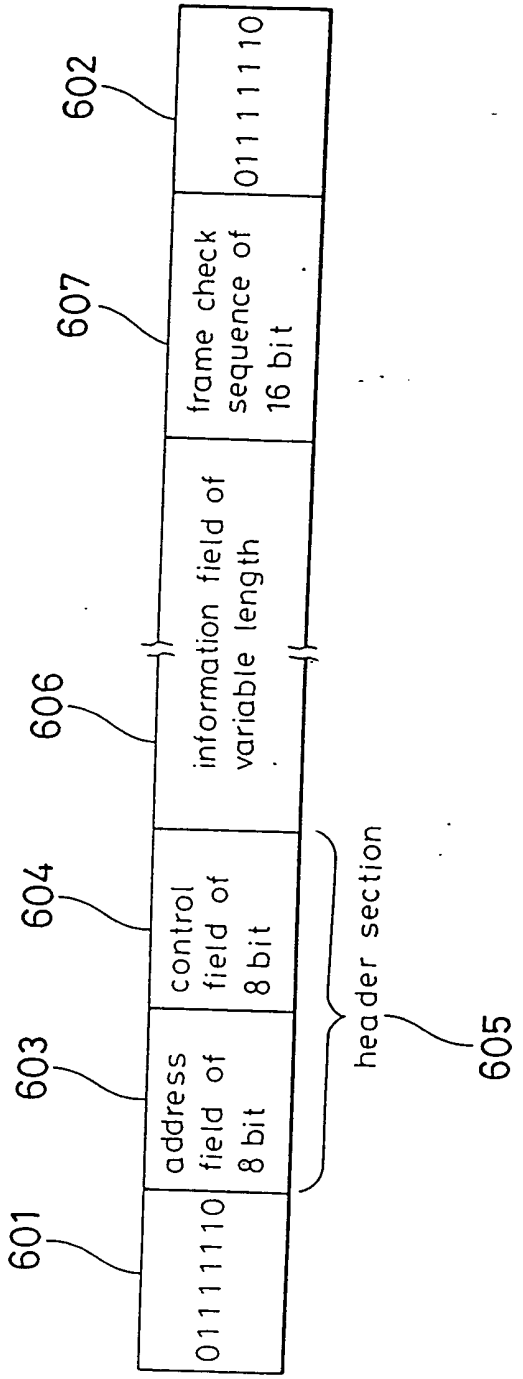
FIG 9.



SPECIFICATION

A still picture transmission apparatus

FIELD OF THE INVENTION

The present invention relates to a still picture transmission apparatus capable of conducting a so-called groop multiple address efficiently, that is, a transmission of the same picture date to a plurality of desired terminals at the same time in a network comprising a central terminal having a picture data bank (hereinafter referred to as "center") and a plurality of local terminals connected to the centre through a single common transmission line (including space transmission).

BACKGROUND OF THE INVENTION

Conventionally, a groop multiple address in a network comprising a center and a plurality of local terminals connected thereto through a single common transmission line such as in an LAN (local area network) or a CATV (community antenna television) is conducted in such a manner that the center should send out a data with a groop address (representation address) which is predetermined for each groop of the local terminals as its transmission destination address, and the local terminal should receive the data including the groop address of that groop to which the terminal belongs.

The operation of the groop multile address will be described with the use of a network shown in Figure 5.

In Figure 5, the reference numeral 100 designates a center having a picture data bank, conssituted by such as a mini-computer, and the picture data is stored in the external memory device thereof. The reference numerals 101 to 105 designate local terminals connected to the center 100 through a single common transmission line 106, which terminals are intended to receive (and decode) the data sent from the center 100 thereby to display the same on a display. A hardware for exclusive use or a personal computer may be used as the local terminal. The local terminals 101 to 105 have terminal addresses of #1 to #5, respectively, and the local terminals 101, 102, and 105 have a groop address of #100, the terminal 103 a groop address of #101, and the terminal 104 a groop address of #102, respectively.

The still picture data is transmitted in a packet form shown in Figure 6. The packet comprises a header section 201 and a data section 202. The header section 201 includes an address field 204 for containing an address designating a transmission destination, which address is intended to make only the local terminal of that address receive this packet.

The manner of transmission will be described with reference to Figure 7.

At first in a usual transmission, when the data TXA is transmitted with the transmission destination address #1, only the local terminal of address #1 receives the data TXA (refer to 400 in Figure 7). Similarly as above when the data TXB, TXC, TXD, TXE are transmitted with the transmission destination address #2, #3, #4, and #5, only the local terminals #2, #3, #4, and #5 receive the data TXB, TXC, TXD, and TXE, respectively (refer to 401 and 404).

Nextly, when the data TXF is transmitted with the groop address #100, that date TXF is received by the local terminals #1, #2, and #5 having a groop address of #100, realizing a groop multiple address (refer to 405). However, in this method, when the multiple address groop should be changed, for example, into such that the data TXG should be multiple addressed to the local terminals of #1, #2, #4, and #5, the following operation must be conducted the data TXG is, at first, sent out to the local terminal #4 (refer to 406), and the data TXG is again sent out with the groop address #100, thereby to multiple address the local terminals #1, #2, and #5 (refer to 407).

In the prior art still picture transmission apparatus under such a construction, a groop address should be predetermined in conducting a groop multiple address, and therefore it was impossible to change the grooping of the local terminals in the midst of system operation.

SUMMARY OF THE INVENTION

The present invention is directed to solve the problems pointed out above, and has for its object to provide a still picture transmission apparatus capable of conducting a grooping of local terminals dynamically, and also conducting a multiple address efficiently.

Other objects and advantages of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detail description and specific embodiment are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

According to the present invention, there is provided a still picture transmission apparatus in which still picture data is transmitted in packet form from the central terminal having a picture data bank selectively to a plurality of local terminals through a common transmission line at which a plurality of logic channels are established, wherein a packet transmission is conducted in such a manner that a command designating a channel number is transmitted to a desired local terminal to which channel the local terminal is to be connected, and a still picture data is transmitted with the use of the packet having said channel number.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a block diagram showing a still picture transmission apparatus as an embodiment of the present invention;

Figure 2 is a diagram showing a format of a transmission packet in the apparatus of Figure 1;

Figure 3 is a diagram showing a transmission format of a command in the apparatus of Figure 1;

Figure 4 is a diagram showing the manner of

transmission at the groop multiple address in the appratus of Figure 1;

Figure 5 is a diagram showing the prior art still picture transmission apparatus;

Figure 6 is a diagram showing a transmission format of a transmission packet in the apparatus of Figure 5; and

Figure 7 is a diagram showing the manner of transmission at the groop multiple address in the apparatus of Figure 5.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

In order to explain the present invention in detail, reference will be particularly made to Figure 1.

In Figure 1, the reference numeral 100 designates a center (central terminal), the numerals 101 to 105 designate local terminals which are connected to the center 100 through a single common transmission line 106 at which a plurality of logic channels can be established. The local terminals 101 to 105 have a terminal address of #1 to #5, respectively.

In this embodiment, the center 100 is intended to transmit to a desired local terminal a command designating a channel number to which channel the local terminal should be connected, and to transmit still picture data in a packet form having the channel number while transmitting packets selectively to a plurality of terminals. Each local terminal has only a terminal address, and does not have a groop address.

In the above embodiment only five local terminals are provided for simplification, but the number of the terminals is not limited thereto.

The data transmission on the transmission line 106 has a packet structure shown in Figure 2. The packet has a header section 201 and a data section 202, and the header section 201 has a channel field 203. The channel field 203 is provided for containing the value of the logic channel through which the packet is transmitted, which value is intended to acknowledge the local terminal which logic channel each packet belongs to. Thus, a plurality of logic channels can be established on a single common transmission line.

In the next place, the following command is defined as a command to be transmitted to the local terminal from the center.

CA(n, m): to connect the channel m to the local terminal of terminal address n.

When the local terminal of terminal address n receives this command, the local terminal receives and decodes the data transmitted through the channel m, that is, only the packet having the value m in the channel field. When n is abbreviated in the designation of the command C(n, m), all the local terminals which have received this command will be connected to the channel m. The command is actually transmitted included in the data section 202 of the packet shown in Figure 3.

The operation of the groop multiple address of this embodiment will be described with reference to Figure 4.

At first the channels 0, that is, the common channels in all the local terminals are connected to each other (refer to 301). At next when the command CA(1, 1) is transmitted from the center 100 through the channel 0, all the local terminals receive and decode the same, and only the channel 1 is connected to the local terminal #1, and the other terminals keep the previous state (refer to 302). Thereafter, the local terminal #1 receives the data from the channel 0 and the channel 1. Similarly as above, the commands CA(2, 1), CA(3, 2), CA(4, 3), and CA(5, 1) are transmitted through the channel 0, whereby the channel 1 is connected to the local terminal #2, the channel 2 to the terminal #3, the channel 3 to the terminal #4, and the channel 1 to the terminal #5, respectively (refer to 303 and 306). Thus the local terminals #1, #2, and #5 become to constitute a groop of terminals which receive a multiple address. Herein, if the data TXA is transmitted through the channel 1, then the data TXA is received by the local terminals #1, #2, and #5 at the same time, and a group multiple address is realized (refer to 307). When the data TXB is transmitted through the channel 2, the data TXB is received only by the local terminal #3 (refer to 308), and similarly as above when the data TXC is transmitted through the channel 3, the data TXC is received only by the local terminal #4 (refer to 309). Furthermore, when the data TSD is transmitted through the channel 0 wich is a common channel, the data TXD is received by all the local terminals #1 to #5 (refer to 310).

Nextly when the command CA(3) is transmitted through the channel 1, the channel which is to be connected to the local terminals #1, #2, and #5 which has just received this command is changed from channel 1 to channel 3 (refer to 311), whereby the groop of terminals which receive the multiple address is changed to one including the local terminals #1, #2, #4 and #5. Therefore, it is possible to conduct a groop multiple address of the data TXE to the local terminals #1, #2, #4, and #5 by transmitting the data TXC to the channel 3 (refer to 312).

The local terminal may be any type one which is capable of receiving packet information. An example of construction using a communication oriented LSI is shown in Figure 8.

In Figure 8 the reference numeral 501 designates a CPU for controlling the whole of the local terminal, and it is combined with a system memory 505, a refresh memory for displaying pictures 506, and a communication oriented LSI 507 by means of an address bus 502, a data bus 503, and a control bus 504. The picture written into the refresh memory 506 is displayed on the CRT display 508. The data transmitted from the center through the transmission line 509 is demodulated by the modem 510, and the received data 511 and the received clock 512 are sent to the LSI 507. On the contrary, when the transmission data 513 and the transmission clock 514 are given to the modem 510 from the LSI, the modem 510 modulates the same to send it out to the transmission line. As the communication oriented LSI 507, a Programmable HDLC/SDLC Protocol Controller 8273 made by Intel

Corporation can be used. This controller 8273 is designed to conduct a packet transmission regulated by CCITT as X.25 (HDLC). Refer to the literature "Microprocessor and Peripheral Handbook: Intel Corporation 1982" as to the detail of the controller 8273.

The packet format of X.25 is shown in Figure 9. The packet is located sandwiched between the opening flag 610 and the closing flag 602. The both of the opening flag 601 and the closing flag 602 have a bit pattern of 01111110. The packet comprises a header section 605 comprising an address field 603 and a control field 604, and an information field 606 which comprises a bit series of transmission information, and a frame check sequence 607 as an addition bit for error detection. In the usual procedure of X.25 the center is designed to conduct a transmission with designating the terminal address by the content of the address field 603. The controller 8273 (507) is intended to detect the content of the address field 603, and to intrude to the CPU 501 through the control base 504 thereby to notify the receiption of the packet when the content of the address field coincides with the local terminal address previously programmed by the CPU 501. When the address does not coincide, an intrusion does not occur. In this way it is possible to transmit data only to the local terminal having the address designated. Futhermore, it is possible to programmably store two values as the address to be detected in the controller 8273, and then an intrusion occurs when either of the two is detected.

On the contrary in this embodiment the address field 603 is used as a channel field so as to show the logic channel through which the packet is transmitted. The CPU 501 programmably stores the number 0 of the common channel and the number m of the channel designated by the above described command CA(n, m) in the controller 8273 (507) as the address to be detected by the controller 8273 (507). Thus the controller 8273 (507) generates an intrusion thereby to notify the same to the CPU 501 only when it receives a packet of the designated channel.

As described above, according to the present invention, a plurality of logic channels are established on a single common transmission line, and a command indicating the number of logic channels which are to be connected to a desired local terminal is transmitted included in a packet. Such a system enables to conduct a simultaneous multiple address, a groop multiple address, and a grooping of multiple address groop easily and efficiently.

CLAIMS

1. A still picture transmission apparatus in which still picture data is transmitted in packet form from the central terminal having a picture data bank selectively to a plurality of local terminals through a common transmission line at which a plurality of logic channels are established, wherein a packet transmission is conducted in such a manner that a command designating a channel number is transmitted to a desired local terminal to which channel the local terminal is to be connected, and a still picture data is transmitted with the use of the packet having said channel number.

2. Picture transmission apparatus substantially as herein described with reference to Figs. 1 to 4 of the accompanying drawings.

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